Compex®

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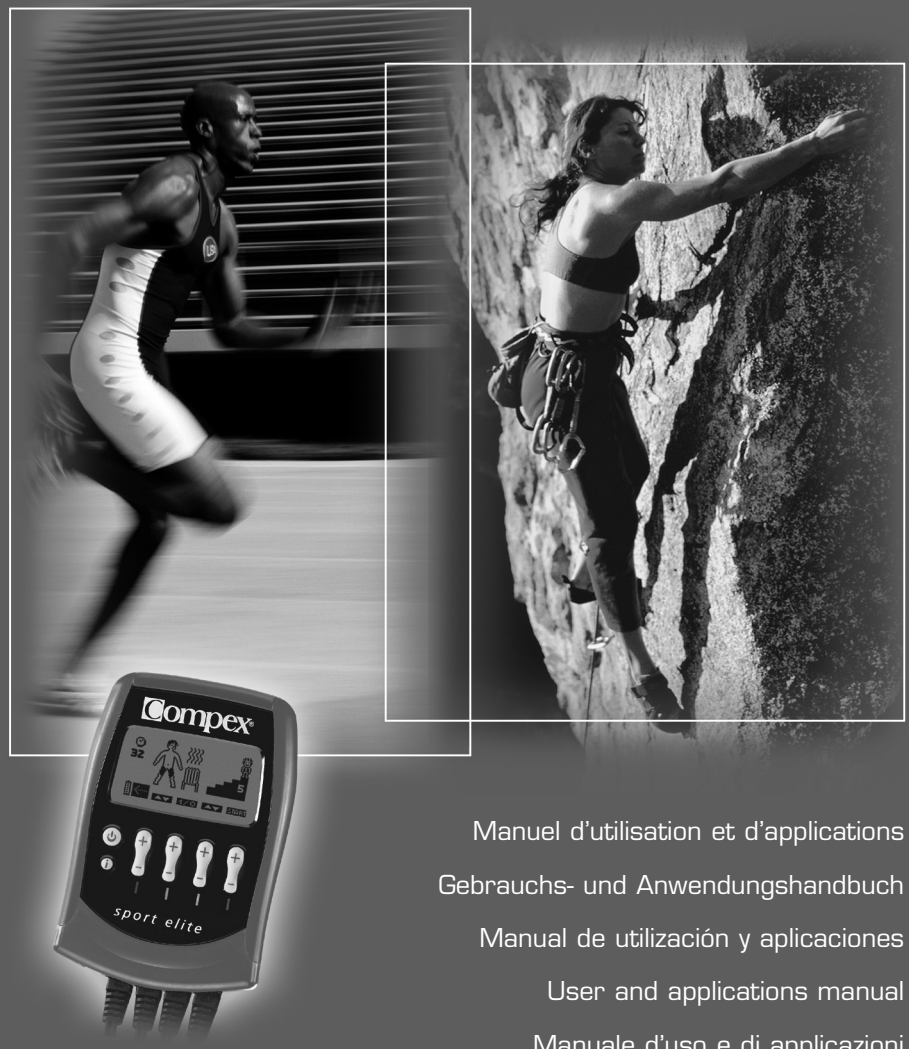
CE 1250

Compex®



sport elite

Manuel d'utilisation et d'applications

Gebrauchs- und Anwendungshandbuch

Manual de utilización y aplicaciones

User and applications manual

Manuale d'uso e di applicazioni

Gebruiksaanwijzing en specifieke toepassingen

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I. WARNINGS

1. Counter-indications

Important counter-indications

- Cardiac stimulator (pacemaker)
- Epilepsy
- Pregnancy (no positioning in the abdominal area)
- Serious arterial circulatory problems in the lower limbs
- Abdominal or inguinal hernia

Precautions when using the Compex

- After trauma or a recent operation (less than 6 months)
- Muscular atrophy
- Persistent pains
- Need for muscular rehabilitation

Osteosynthesis equipment

The presence of osteosynthesis equipment (metallic equipment in contact with the bone: pins, screws, plates, prostheses, etc.) is not a contra-indication for the use of Compex programmes. The electrical current of the Compex is specially designed to have no harmful effect with regard to osteosynthesis equipment.

In all of the above cases, you are advised to:

- never use the Compex for prolonged periods without medical advice;
- consult your doctor if you are in any doubt whatsoever;
- read this manual carefully, in particular chapter VI, which provides information concerning the effects and indications of each stimulation programme.

2. Safety measures

What you should not do with the Compex

- Do not use the Compex in water or in a humid atmosphere (sauna, hydrotherapy, etc.).
- Never carry out an initial stimulation session on a person who is standing. The first five minutes of stimulation must always be performed on a person who is sitting or lying down. In rare instances, very highly strung people may have a vagal reaction. This is of psychological origin and is connected with a fear of the muscle stimulation as well as surprise at seeing one of their muscles contract without having intentionally contracted it themselves. This vagal reaction produces a feeling of weakness with a fainting tendency, slowing down of the heartrate and a reduction in arterial blood pressure. If this does occur, all that is required is to stop the stimulation and lie down with the legs raised for the time it takes for the feeling of weakness to disappear (5 to 10 minutes).
- Never allow movement resulting from muscular contraction during a stimulation session. You should always stimulate isometrically; this means that the extremities of the limb in which a muscle is being stimulated must be firmly fixed, so as to prevent the movement that results from contraction.
- Do not use the device at less than 1.5 metres from a short-wave device, a micro-wave device or high frequency (H.F.) surgical equipment to avoid the risk of causing skin irritations or burns under the electrodes. If you are in any doubt about using the Compex in close proximity to any

other medical device, please consult its manufacturer or your doctor.
■ Only use the electrode cables supplied by Compex.
■ Do not disconnect the stimulator electrode cables during the session without first switching off the stimulator.
■ Never connect stimulation cables to an external electric power supply because of risk of electric shock.
■ No not use rechargeable batteries other than the one supplied by Compex.
■ Never recharge the stimulator when cables and electrodes are still connected onto the user.
■ Never recharge the batteries with another charger than the one supplied with the Compex.
■ Never use the Compex or the charger if it is damaged (case, cables, etc.) or if the compartment for the rechargeable battery is open. There is a risk of electric discharge
■ Disconnect immediately the charger if the Compex "bleeps" continuously, in case of abnormal heating or smell, or if smoke comes from the charger or the Compex. Do not recharge the batteries in a confined area (case, etc.) because of risk of fire or electric discharge.
■ Keep the Compex and its accessories out of the reach of children.
■ Do not allow any foreign items (soil, water, metal, etc.) to enter into the Compex, the compartment for the rechargeable battery and the charger.
■ Sudden temperature variations can create droplets in the device due to condensation. Use the device only once it reached ambient temperature.
■ Do not use the Compex while driving or operating machinery.
■ Do not use the stimulator in the mountains at an altitude higher than 3.000 metres.

Where you should never apply electrodes...

■ To the head.
■ Counter-laterally: Do not use the two poles of the same channel (one electrode connected to the positive/red pole and one electrode connected to the negative/black pole) on either side of the body centreline (eg: right arm and left arm).
■ To or in the vicinity of skin lesions of any kind (wounds, inflammations, burns, irritations, eczema, etc.).

Precautions when using the electrodes

■ Only use the electrodes supplied by Compex. Other electrodes may have electrical properties that are unsuitable for the Compex stimulator
■ Do not remove or move the electrodes during a stimulation session without first switching off the instrument.
■ Do not plunge the electrodes into water.
■ Do not apply a solvent of any kind to the electrodes.
■ Before applying the electrodes, it is recommended to wash and degrease the skin, and then dry it
■ Apply the whole surface of the electrodes to the skin.
■ For very important reasons of hygiene, each user must have his own electrode set. Do not use the same electrodes on different people.
■ Do not use a set of electrodes for more than fifteen sessions, as the quality of the contact between the electrode and the skin, which is important for the comfort and effectiveness of stimulation, progressively degrades.
■ In certain people with very sensitive skin, redness may be observed under the electrodes after a stimulation session. Generally, this redness is completely harmless and disappears after 10 to 20 minutes.

However, avoid starting a stimulationsessionon the same area until the redness is no longer evident.

II. PRESENTATION

1. Reception of equipment and accessories

Your stimulator is supplied with:

– The stimulator
– A battery charger
– One set of electrode cables with colour indicators (blue, green, yellow, red)
– Bags containing the electrodes (small (5 x 5 cm) and large (5 x 10 cm) electrodes)
– A user and applications manual
– A poster with the pictures for the placements of electrodes and the stimulation positions
– A DVD explaining how to use your Compex and the training planner
– A belt clip

2. Presentation of the device

A – "On/Off" switch

B – "i" button. To increase the energy level of several channels simultaneously

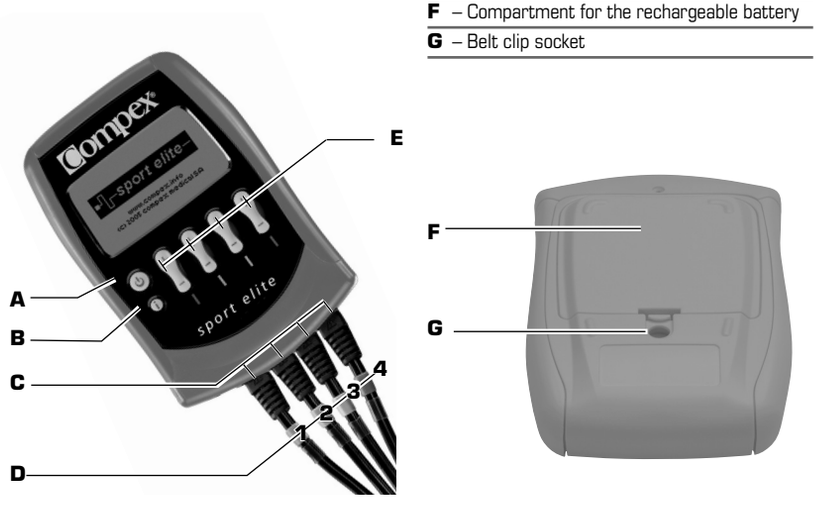
C – Sockets for the 4 electrode cables

D – Electrode cables
channel 1 = blue channel 2 = green
channel 3 = yellow channel 4 = red

E – "+"/"–" keys of the 4 stimulation channels

F – Compartment for the rechargeable battery

G – Belt clip socket



3. Guarantee

The Compex stimulators are contractually covered with a guarantee of 2 (two) years: register on our web site: www.compex.info (section "Register").
The Compex guarantee comes into effect on the date of purchase of the device.
The Compex guarantee applies to the stimulator (goods and work) and does not cover cables and electrodes. It covers all the defects resulting from a problem of quality of the material or from a defective manufacture. The guarantee does not apply if the device was damaged further to a shock, guarantee does not apply if the device was damaged further to a shock,

The guarantee is valid only on presentation of proof of purchase

Legal rights are not affected by this guarantee.

4. Maintenance

To clean your unit, use a soft duster and an alcohol-based cleaning product, which does not contain any solvents. In fact, solvents could damage the plastic parts, especially the panel covering the screen of your Compex.
The user must not attempt any repairs to the device or any of its accessories. Never dismantle the Compex or the charger containing high-voltage parts because of risk of electric discharge.
Compex Médical SA declines all responsibility for damages and consequences resulting from any attempt to open, modify or repair the device or any of its components by a person or a service centre not officially approved by Compex Médical SA.
Compex stimulators do not require calibration or verification of performance parameters. The characteristics are systematically verified and validated for each device manufactured. These characteristics are stable and do not vary when used under normal conditions.
If your device seems not to function as expected, regardless of the situation, contact an official Compex service centre for assistance.
Medical and health professionals must refer to local legislation for information related to maintenance. Normally, these laws require verification of certain criteria at regular intervals.

5. Storage and transportation conditions

The Compex contains rechargeable batteries and so the storage and transportation conditions must not exceed the following figures:

Storage and transportation temperature	from -20°C to 45°
Max. relative humidity	75 %
Atmospheric pressure	from 700 hPa to 1060 hPa

6. Use conditions

Temperature of use	from 0°C to 40°C
Max. relative humidity	from 30% to 75%
Atmospheric pressure	from 700 hPa to1060 hPa

Do not use in an explosion risk area.

7. Elimination

The Directive 2002/96/CEE (WEEE) has a first priority, the prevention of waste electrical and electronic equipment, and in addition, the re-use, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste.
The pictogram wheeled bin barred means that the equipment can not be thrown with the household refuse, but that it makes the object of a selective collection.
The equipment has to be given to a suitable collection point for the treatment.
By this way, you contribute to the safeguarding of the natural resources and the human health protection.
Batteries must be disposed of in accordance with your country's national laws governing the disposal of such items.

8. Standards

The Compex is based directly on medical technology.
To guarantee your safety, the design, manufacturing and distribution of Compex are in conformity with the requirements of the European Directive 93/42/CEE.
The device is in conformity with the standard for general safety rules for electromedical devices IEC 60601-1, the standard for electromagnetic compatibility IEC 60601-1-2 and the standard for special safety rules for nerve and muscle stimulators IEC 60601-2-10.
Current international standards (IEC 60601-2-10 AM1 2001) require that a warning be given concerning the application of electrodes to the thorax (increased risk of cardiac fibrillation).
Directive 2002/96/CEE Waste electrical and electronic equipment (WEEE).

9. Patent

Snap electrode: patent pending.

10. Normalised symbols

Important: Under some conditions, the effective figure for the stimulation pulses can exceed 10 mA and 10 V. The information given in this handbook must be strictly observed.

The Compex is a class II device unit with its own internal electric power, with type BF applied sections

Waste electrical and electronic equipment (WEEE)

The "On/Off" switch is a multi-function key:

Functions	Symbol	N°(according to CEI 878)
On/Off (2 positions, stable)		01-03
Waiting or preparation for part of the unit		01-06
Stop (switching off)		01-10

11. Technical information

General points

Power supply NIMH rechargeable battery (4,8 V ª 1200 mA/h)
Chargers: The only chargers used for recharging the battery bear the following information:

EUROPE

Type TR503-02-E-133A03
Input 90-264 VAC / 47-63Hz / 0.5A max.
Output 9V / 400mA / 6W

Type TR1509-06-E-133A03
Input 90-264 VAC / 47-63Hz / 0.5A max.
Output 9V / 1.4A / 15W

USA

Type TR503-02-A-133A03
Input 90-264 VAC /47-63Hz / 0.5A max.
Output 9V / 400mA / 6W

Type TR1509-06-A-133A03
Input 90-264 VAC / 47-63Hz / 0.5A max.
Output 9V / 1.4A / 15W

UK

Type TR503-02-U-133A03
Input 90-264 VAC / 47-63Hz / 0.5A max.
Output 9V / 400mA / 6W

Type TR1509-06-U-133A03
Input 90-264 VAC / 47-63Hz / 0.5A max.
Output 9V / 1.4A / 15W

Neurostimulation

All electrical specifications are given for a charge between 500 and 1000 ohms per channel.

Channels: four independent and individually adjustable channels electrically insulated from each other and from ground

Impulse shape: constant rectangular current compensated to eliminate any direct current component to avoid any residual skin polarisation

Maximum current of an impulse: 120 milliamperes

Intensity increase interval:
– Manual stimulation intensity adjustment: 0-999 (energy units)
– Impulse duration: 0.5 mA
From 50 to 400 microseconds

Maximum quantity of electricity per impulse: 96 microcoulombs (2 x 48 µC compensated)

Typical rise time for an impulse
3 microseconds (between 20% and 80% of maximum current)

Impulse frequency
from 1 to 150 Hertz

III. DIRECTIONS FOR USE

Before using the unit for the first time, you are strongly advised to take careful note of the counter-indications and safety measures detailed at the beginning of this manual (chapter I: "Warnings"), as this powerful equipment is neither a toy nor a gadget!

1. Connections

The electrical impulses generated by the Compex are transmitted to the nerves by self-adhesive electrodes.
The choice of the size, the connection and the correct positioning of the electrodes are essential factors for ensuring effective and comfortable stimulation. So they require particular care.
To do all this – and for information on the recommended stimulation positions – refer to the pictures and pictograms in the poster, and to the "Table with placements of electrodes and stimulation positions" in chapter VII. The specific applications contained in chapter VI also provide useful relevant information.

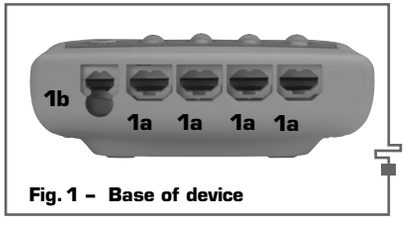


Fig. 1 – Base of device

1a Sockets for the four electrode cables
1b Socket for the battery charger

Connecting the electrodes and cables.

The electrode cables are connected to the stimulator through sockets on the base of the device.
Four cables can be connected simultaneously to the four channels of the device.
For easier use and better identification of the four channels, we advise you to follow the colour of the electrode cables and the stimulator sockets:

blue = channel 1 yellow = channel 3
green = channel 2 red = channel 4

It is important to place the electrodes correctly to the cable connectors; in order to do so, press strongly the connector to the electrode until you bear a double click.

Connecting the charger

The Compex has considerable operating autonomy, as it uses rechargeable batteries. To recharge them, use the charger supplied with your device and connect it to the base of the device, then plug the charger in a socket.
To recharge the Compex, first disconnect the electrode cables from the device.
Before using your stimulator for the first time, it is always strongly recommended that you completely charge the battery to improve its autonomy and extend its working life.

2. Preliminary settings: language, light intensity and sound volume

Before using the unit for the first time, you should select the working language of the device which is displayed on the options screen. Proceed as per the instructions described below.
Afterwards, for the greatest comfort, Compex offers you a number of setting options (operating language selection, display contrast setting and sound volume setting).
To do this, display the options screen by pressing the "On/Off" switch on the left of the Compex and hold it down for a few seconds.

Fig. 2

2a To select the language of your choice, press the "+"/"–" key of channel 1 (to go up or down), until the desired language is displayed in white characters on a black background.

2b To set the contrast of the display, press the "+"/"–" key of channel 2 ("+" to increase the preferred percentage and "–" to reduce it).

2c To set the sound volume, press the "+"/"–" of channel 3 ("+" to increase the preferred percentage and "–" to reduce it).

2d To confirm the parameters selected, press the "On/Off" switch. Your stimulator saves your options. It is now ready for use with the settings you selected.

3. Selecting a programme category

To switch on your stimulator, briefly press the "On/Off" switch on the left of the Compex. A musical signal can be heard and a screen showing the different programme categories is displayed.
Before choosing a programme, you should select the desired category.

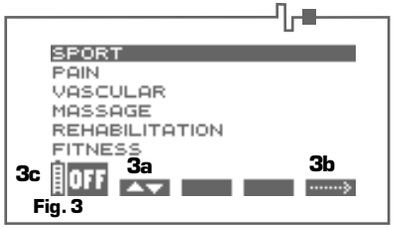


Fig. 3

3a To select the desired category, press the "+"/"–" key of channel 1 (to go to the left) or channel 3 (to go to the right), until the desired category is displayed in a frame.

3b To confirm your choice and to move on to the programme selection screen (see the next section: "Selecting a programme"), press the "+"/"–" key of channel 4

3c Press the "On/Off" key to switch off the stimulator.

4. Selecting a programme

To choose a programme, it is particularly useful to consult chapter VI of this manual ("Programmes and specific applications").

Regardless of the category you selected in the previous step, a list containing a select number of programmes appears on the screen.

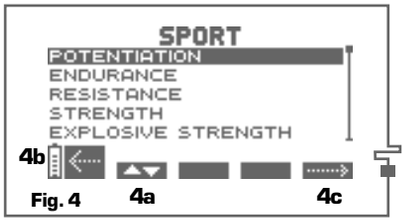


Fig. 4

4a To select the desired programme, press the "+"/"–" key of channel 1 (to go up or down), until the desired programme is displayed in white characters on a black background.

4b Press the "On/Off" key to return to the previous screen.

4c After selecting the desired programme, press the "+"/"–" key of channel 4 which, depending on the programme selected, displays the symbol START or ⋯⋯→.

a) START = the stimulation session starts immediately;

b) ⋯⋯→ = a parameter setting screen displays.

5. Personalising a programme

The programme personalisation screen is not available for all programmes

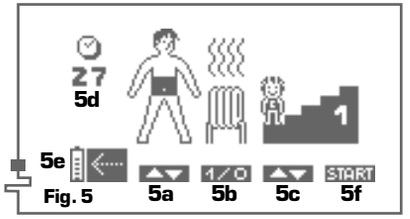


Fig. 5

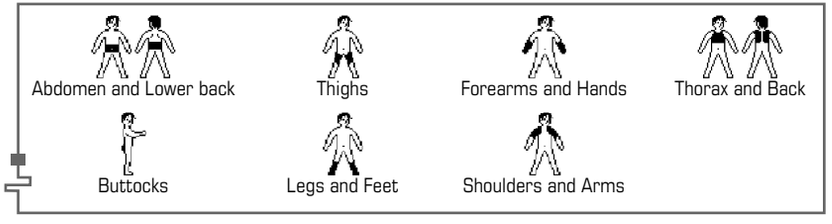
5a Certain programmes require manual selection of the muscular group that you want to stimulate and a figurine is displayed above channel 1.
To select your desired group, press the "+"/"–" key of channel 1 (to go up or down). The seven muscular groups are displayed in succession in black on the figurine:

5b The warming-up sequence suggested for some programmes is active by default (an animated rising convection symbol above the heater). If you prefer to skip this sequence, press the "+"/"–" key of channel 2.

Warming-up

No warming-up

Current international standards require that a warning be given concerning the application of electrodes to the thorax (increased risk of cardiac fibrillation).



5c Certain programmes allow you to adjust the level of work. To do this, press the "+"/"–" key of channel 3 (to go up or down), until the desired level of work is displayed.

Level 1 Level 2 Level 3 Level 4 Level 5

5d Total programme time in minutes.

5e By pressing the "On/Off" key, you can return to the previous screen.

5f To confirm your selection and start the programme, press the "+"/"–" key of channel 4.

English

6. During the stimulation session

Setting stimulation energy

When the programme starts, the Compex prompts you to increase the stimulation energy, a key factor for the effectiveness of the stimulation.

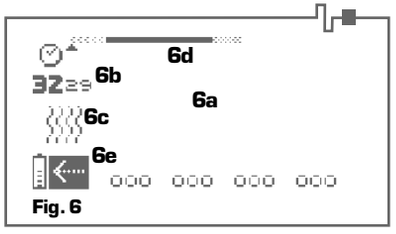


Fig. 6

6a Le The Compex "bleeps" and the symbols of the four channels flash, changing from "+" to "000": the four channels are at 0 energy. You must increase the stimulation energy so that the stimulation can start. To do this, press the "+" of the keys of the relevant channels, until the desired setting is reached.
If you want to increase the energy level of all four channels simultaneously, press the "i" button, located below the "On/Off" key. You can also increase the energy level of three first channels, by pressing the "i" button twice, or the energy level of two first channels only, by pressing three times this button.
Once you activate the "i" button, the associated channels are highlighted in white on a black background.

6b Remaining time in minutes and seconds.

6c The animated rising convection symbol represented the warming-up sequence.

6d Session progression scale. For details on how it works, see the following section ("Programme progression").

6e By pressing the "On/Off" key, you can return to the previous screen.

Programme progression

Stimulation does really start when the stimulation energy has been increased. The screens that are displayed during stimulation allow you to observe the progression of the session. These screens may differ from one programme to another. The examples reproduced below are sufficient for you to understand the general rules.

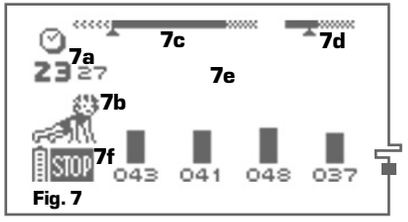


Fig. 7

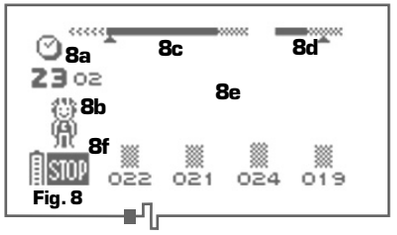


Fig. 8

7a-8a Remaining time (in minutes and seconds) before the end of the programme.

7b-8b A small animated symbol indicating category to which the programme belongs.

7c-8c Session progression scale:
The progression scale is composed of three distinct parts: the programme consists of three stimulation sequences, i.e., warming up (light hatching /left), the actual work (black area/centre) and relaxation at the end of the programme (heavier hatching/right).
The progression scale can be also entirely hatched: the programme then consists of a single stimulation sequence.
The small cursor located just below the scale moves horizontally and indicates precisely the state of progression of the programme (here: start of the first sequence, i.e., the work sequence).

7d-8d Contraction and active rest time bar: This bar is displayed at the right of the progression scale, but only during the work sequence. It indicates the duration of the contraction and active rest times.
7d The cursor is located under the black (left) part of the bar: you are in a muscular contraction phase.

8d The cursor is located under the hatched (right) part of the bar: you are in an active rest phase.

The stimulation energy during the active rest phase is automatically set at 50% of the stimulation energy during the muscular contraction.

7e-8e Bar charts:
7e The muscular contraction phase is represented by the bar charts of the stimulation channels used (which become black during the contraction phase).
8e The active rest phase is represented by the bar charts of the stimulation channels used (which become hatched during the active rest phase).
The stimulation energy during the active rest phase is automatically set at 50% of the stimulation energy during the muscular contraction.

7f-8f You can interrupt the programme momentarily (STOP = "PAUSE") ") by pressing the "On/Off" key. If you wish to restart the session, simply press the "+"/"–" key of channel 4.

After an interruption, stimulation restarts at 80% of the stimulation energy set before the STOP.

Adjusting stimulation energy

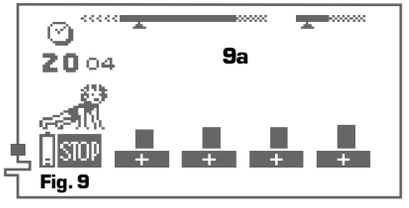


Fig. 9

9a During the session, the Compex "bleeps" and some + symbols start to flash above the active channels (over the energy indications): the Compex is prompting you to increase the stimulation energy level. If you cannot support an increase of the energy, just ignore this message.

End of programme

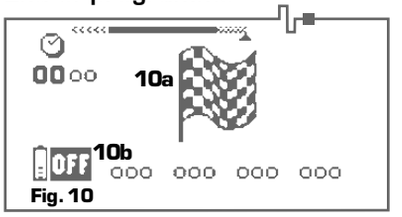


Fig. 10

10a At the end of the session, you hear a musical signal and a small flag is displayed.

10b It is then only necessary to switch off the stimulator by pressing the "On/Off" key (OFF).

7. Electricity consumption and recharging

Never recharge the stimulator with cables still connected to it.Never recharge the batteries with a charger different from the one supplied by Compex.

The Compex runs on rechargeable batteries. The discharge time depends on the programmes and stimulation energy used.
Before using your stimulator for the first time, it is always strongly recommended that you completely charge the battery to improve its autonomy and extend its working life.
If you do not use your device for a long period of time, please regularly recharge the battery.

Electricity consumption

The symbol of a small battery indicates the charge level of the batteries.

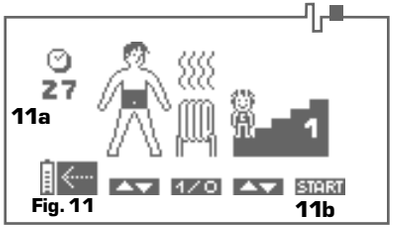


Fig. 11

11a The small battery symbol has only two reference marks: The batteries are losing their charge. Interrupt the session and recharge the device (see the following section).

11b The START, symbol normally displayed above the "+"/"–" key of channel 4 has disappeared ( ) and the small battery flashes: The batteries are completely flat. It is no longer possible to use the device. Recharge it immediately (see the following section).

Recharging

To recharge the Compex, first disconnect the electrode cables from the device, then plug the charger in a socket and lastly connect the stimulator to the charger (see in section I: "Connecting the charger"). The charge menu illustrated below appears automatically.

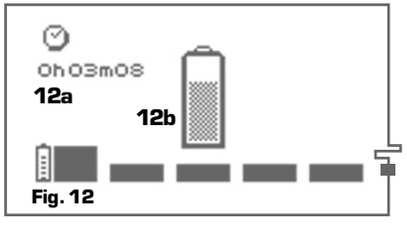


Fig. 12

12a The Compex has been charging for 3 minutes and 8 seconds (a full charge may take from 1h30 to 2 hours with the rapid charger delivered with your device).

12b Charging is in progress and the small battery symbol is not completely full.
When charging is completed, total charge duration flashes and the small battery is completely full. The Compex switches off automatically as soon as you disconnect the charger.

8. Problems and solutions

Electrode fault

13a-14a The Compex "bleeps" and alternatively displays the symbol of a couple of electrodes and an arrow pointing to the channel where a problem has been detected. Below, the stimulator has detected an electrode fault on channel 2
This message may mean that:

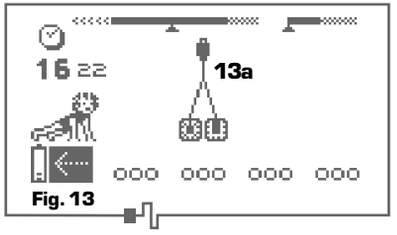


Fig. 13

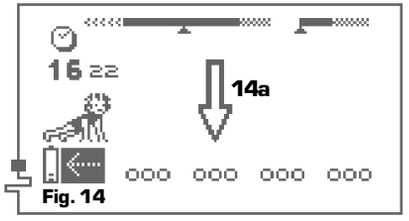


Fig. 14

1) there is no electrode connected to this channel;
2) the electrodes are old, worn out and/or the contact is poor: try using new electrodes;
3) the electrode cable is defective: try it using another channel. If cable shows a default again, please replace.

Recharging error

A recharging error may happen during charging. The Compex "bleeps" continuously and the following screen is displayed:

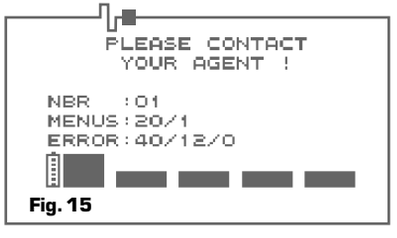


Fig. 15

If this message appears, disconnect the charger and the device switches off automatically. Please contact the hotline, noting this error code.
If, for any reason, you experience any other trouble with your device, please contact the hotline mentioned and approved by Compex Médical SA.

IV. HOW DOES ELECTROSTIMULATION WORK

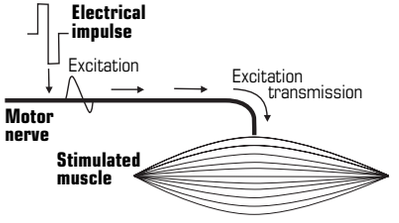
The principle of electrostimulation is to stimulate nerve fibres by means of electrical impulses transmitted by electrodes.
The electrical impulses generated by Compex stimulators are high-quality impulses – ensuring safety, comfort and efficiency – that stimulate different types of nerve fibres:

1. the motor nerves to stimulate a muscular response. The quantity of work and the benefits obtained depend on the stimulation parameters. This is known as electromuscularstimulation (EMS).

2. certain types of sensitive nerve fibres to obtain analgesic or pain-relieving effects.

1. Motor nerve stimulation (EMS)

In voluntary activity, the order for muscular work comes from the brain, which sends a command to the nerve fibres in the form of an electrical signal. This signal is then transmitted to the muscular fibres, which contract.
The principle of electrostimulation accurately reproduces the process observed during a voluntary contraction. The stimulator sends an electrical current impulse to the nerve fibres, exciting them. This excitation is then transmitted to the muscular fibres causing a basic mechanical response (= muscular twitch). The latter constitutes the basic requirement for muscular contraction.
This muscular response is completely identical to muscular work controlled by the brain. In other words, the muscle cannot distinguish whether the command comes from the brain or from the stimulator.
The parameters of the Compex programmes (number of impulses per second, contraction time, rest time, total



Basic mechanical response = muscular twitch

programme time) subject the muscles to different types of work, according to muscular fibres. In fact, different types of muscular fibres may be distinguished according to their respective contraction speed: slow, intermediate and fast fibres. The fast fibres will obviously predominate in a sprinter, while a marathon runner will have more slow fibres. With a good knowledge of human physiology and a perfect mastery of the stimulation parameters of the various programmes, the muscular work can be directed very precisely towards the desired goal (muscular reinforcement, increased blood flow, firming up, etc.).

2. Stimulation of the sensitive nerves

The electrical impulses can also excite the sensitive nerve fibres to obtain an analgesic or pain-relieving effect.
The stimulation of the tactile sensitive nerve fibres blocks the transmission of pain by the nervous system. The stimulation of another type of sensitive fibres creates an increase in the production of endorphins and, therefore, a reduction of pain.

With pain relief programmes, electrostimulation can be used to treat localized sharp or chronic pains as well as muscular pains.

Warning: do not use the pain relief programmes for a long period without medical advice.

Benefits of electrostimulation

Electrostimulation is a very effective way to make your muscles work:

- with significant improvement of different muscular qualities,
- without cardio-vascular or mental fatigue,
- with limited stress on the joints and tendons.

Electrostimulation thus allows a greater quantity of work by the muscles compared with voluntary activity.

To be effective, this work must involve the greatest possible number of muscular fibres. The number of fibres working depends on the stimulation energy. It will therefore be necessary to use the maximum tolerable energy. The user controls this aspect of stimulation. The higher the stimulation energy, the greater the number of muscular fibres that are working and, therefore, the more significant the progress achieved.

To maximize your results, Compex recommends that you complement your electrostimulation sessions with other efforts, like:

- regular exercise,
- proper and healthy nutrition,
- balanced lifestyle.

V. USE PRINCIPLES

The use principles presented in this section should be considered general rules. For all programmes, it is recommended that you read carefully the information and advice on use presented in chapter VI of this manual ("Programmes and specific applications").

1. Placement of electrodes

It is recommended that you comply with the suggested placements. To do this, refer to the pictures and pictograms shown on the poster and to the "Table with placements of electrodes and stimulation positions" in chapter VII.

A stimulation cable consists of two poles:

a positive pole (+) = red connection

a negative pole (–) = black connection

A different electrode must be connected to each of the two poles.
Note: It is possible and normal to have an electrode arrangement that leads one electrode connection free from a cable.
Depending on the characteristics of the current used for each programme, the electrode connected to the positive pole (red connection) is more effective when placed in a "strategic" position.
For all muscle electrostimulation programmes, i.e., programmes involving muscle contractions, it is important to place the positive polarity electrode on the muscle motor point.
The choice of electrodes size (large or small) and the correct positioning of the electrodes on the muscular group to be stimulated are determinant and essential factors for the effectiveness of the stimulation.

Therefore, always use the size of electrodes shown in the pictures. Unless you have other specific medical instructions, always follow the placement directions in the pictures. If necessary, find the best position by slightly moving the positive polarity electrode, so as to obtain the best muscle contraction or the position that seems most comfortable.

Compex Group disclaims all responsibility for electrodes positioned in any other manner.

2. Stimulation positions

To determine the stimulation position to adopt depending on the placement of the electrodes and the chosen programme, refer to the pictures and pictograms on the poster and to the "Table with placements of electrodes and stimulation positions" in chapter VII.

The stimulation position depends on the muscular group to be stimulated and the programme chosen.
For the programmes involving powerful muscular contractions, the muscle should always be stimulated in an isometric fashion. Consequently, you should fix the extremity of the stimulated limb(s) firmly. In this way, you provide maximum resistance to the movement and prevent any shortening of the muscle during the contraction, which could create cramp pains and serious stiffness after the session. For example, when stimulating the quadriceps, the user should be in a seated position with the ankles fixed with straps to prevent extension of the knees.
For the other types of programmes (for example, the **Pain** programmes and the **Active recovery** programme), which do not involve powerful muscular contractions, position yourself as comfortably as possible.

3. Setting the stimulation energy level

In a stimulated muscle, the number of recruited fibres depends on the stimulation energy. For the programmes involving powerful muscular contractions, it is therefore absolutely necessary to use maximum stimulation energy, always at the limit of what you can support, so as to involve the greatest possible number of fibres.
The "Table with placements of electrodes and stimulation positions" in chapter VII provides information on the energy to use, depending on the selected programme.

4. Progression in the levels

In general, it is not advisable to go through the different levels quickly with the intention of reaching level 5 as fast as possible. In fact, the different levels correspond to progress with electrostimulation.
The simplest and most usual procedure is to start with level 1 and raise the level when changing to a new stimulation cycle.
At the end of a cycle, you may either start a new cycle at the next level up or do some maintenance at the rate of 1 session a week at the last level reached.

VI. PROGRAMMES AND SPECIFIC APPLICATIONS

The applications that follow are given by way of example. They provide a better understanding of how electrostimulation sessions can be combined with voluntary activity. These protocols will help you to determine the best procedure to follow depending on your needs (choice of the programme, muscular group, duration, placement of the electrodes, body position).

You can of course choose a muscular group different from the one indicated, depending on the activities you practice or the body area you wish to stimulate.
The specific applications provide you information on the placement of electrodes and the stimulation position to adopt. This information is represented by numbers (placement of electrodes) and letters (stimulation position). They refer to the “Table with placements of electrodes and stimulation positions” in chapter VII and to the poster with the pictures for the placements of electrodes and the pictograms for the body positions. The table also indicates the stimulation energy to use, according to the programme
You must select in the device the muscular group indicated on the figurine. When no figurine appears (–), it is not necessary to choose the muscular group: the selection is automatic.

Sport category

Neglected for many years, muscle preparation has today become indispensable for the competitive athlete. In this respect, muscular electrostimulation is a complementary training technique widely used by an increasing number of athletes aiming to improve their level of performance. Increasing the maximum strength of a muscle, developing muscular volume, increasing the explosive strength of muscles or improving the capacity of muscle fibres to sustain effort over long periods of time are objectives that differ according to the sporting discipline being practised. Ensuring optimal muscle preparation immediately before competition, combining electrostimulation with voluntary muscle training, optimising the effects of training techniques such as stretching, reproducing the muscular stress resulting from "plyometric" training or imposing a "restoration" activity on muscles is easily accessible today thanks to the high specificity of the new programmes offered by your Compex. The programmes of the Compex Sport category are designed to improve the muscle qualities of competitive athletes training seriously on a voluntary basis for at least five hours a week.
For the four basic training programmes, Endurance, Resistance, Strength and Explosive strength, you are strongly advised to consult the Training planner available in the user DVD. An interactive questions and answers system gives you access to a personalized training plan.
Use of programmes of the Sport category is not suitable for atrophied muscles that have suffered any kind of pathological process. For such muscles, it is essential to use programmes of the Rehabilitation category (see section "Rehabilitation category" of this manual).
The protocols that follow are given by way of example only. They provide a better understanding of how electrostimulation sessions can be combined with voluntary training.
To define the level of Sport programmes in relation with your personal characteristics, please see the training planner available on the user DVD.

At the end of a cycle, you may either start a new cycle at the next level up or do some maintenance at the rate of 1 session a week at the last level reached

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Programmes	Effects	Uses
Potentiation	Increased speed of contraction and power gain Less nervous effort to attain maximum strength	For optimum muscle preparation immediately before competition
Endurance	Improved absorption of oxygen by the stimulated muscles Improved performance for endurance sports	For athletes who wish to improve their performance in long-duration sporting events
Resistance	Improved absorption of oxygen by the stimulated muscles Improved performance for endurance sports	For athletes who wish to improve their performance in long-duration sporting events
Strength	Increased maximum strength Increased rate of muscular contraction	For competitive athletes practising a discipline that requires strength and speed
Explosive strength	Increases the speed at which the level of strength is attained Improved efficiency of explosive actions (jumping, sprinting, etc.)	For athletes practising a discipline in which explosive strength is an important factor in performance
Hypertrophy	Increased muscle volume Increased muscle resistance	For competitive athletes who wish to increase their muscle mass For body-builders

Programmes	Effects	Uses
Fartlek	Training and preparation of muscles for all kinds of muscular work (endurance, resistance, strength, explosive strength) through different working sequences	At the beginning of the season to "re-set" the muscles after a rest period and before more intensive and specific training During the season for those who do not have any preferences for a single kind of performance and prefer to exercise their muscles with different work-out methods
Stretching	To optimise the effects of the voluntary technique of stretching, by means of a reduction of muscular tonus obtained by specific activation of the antagonist of the stretched muscle (reciprocal inhibition reflex)	For all athletes who wish to maintain or improve their muscular elasticity To be used after all training sessions or during a specific stretching session
Active recovery	Marked increase in blood flow Accelerates the elimination of waste from the muscular contraction Endorphinic effect (see Pain category) Relaxing effect	To improve and accelerate the muscle recovery after an intensive exercise To be used during the first 3 hours after each session of intensive training or after a competition
Regeneration	Analgesic effect through the release of endorphins Marked increase in blood flow encouraging oxygenation and drainage Activation of the oxydative metabolism Reactivation of proprioceptive pathways	To be used the day after competition as recovery training or as a complement to this type of training, the intensity of which can then be reduced

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Specific applications

Use of Potentiation programme to optimise the effects of explosive strength (sprints, jumps, squash, football, basketball, etc.) immediately before specific training or competition

The **Potentiation** programme should be used on the key muscles involved in the discipline practised. In this example, the key muscles of the sprinter (quadriceps) will be stimulated. For other disciplines the choice of muscles to be stimulated may be different (refer if necessary to the Training planner in the CD-ROM).

The **Potentiation** programme must not take the place of the voluntary warm-up usually performed before the competition. Activation of the cardiovascular system, short accelerations becoming progressively faster, practice starts and stretching will therefore be carried out by the athlete according to his normal routine. A **Potentiation** session of short duration (approximately 3 minutes) will be applied on the sprinter's quadriceps immediately before the start of his race (or races, in the event of qualifying events). The specific muscular activation of the **Potentiation** programme allows the maximum level of performance to be attained in the very first seconds of the race.

Cycle duration: 1x

Always carry out the session as soon as possible before the start and at all events not more than 10 minutes before the start. After 10 minutes, the phenomenon of potentiation of muscle fibres quickly wears off

Programme: **Potentiation** 8G

Preparation for a cyclist training three times a week who wishes to improve endurance performance

Effort expended over a long period of time makes demands on the aerobic metabolism, for which the decisive factor is the quantity of oxygen consumed by the muscles. To progress in endurance, it is therefore necessary to increase as much as possible the supply of oxygen to the muscles stimulated by this type of effort. Because oxygen is conveyed by the blood, it is essential to have an efficient cardiovascular system, due to voluntary training under certain conditions. However, a muscle capacity to consume the oxygen it receives (oxydative capacity) can also be improved by following a specific work regime.

The **Endurance** programme of the Sport category leads to a significant improvement in the consumption of oxygen by muscles. Combining this programme with the **Capillarization** programme (**Vascular** category), which develops the network of intramuscular capillaries, is particularly beneficial and allows endurance athletes to improve their performance levels.

Cycle duration: 8 weeks, 5 x/week.

Eg for 1 week

Mon: Rest

Tue: 1 x **Endurance** 8G

Wed: Cycle training 1h30 (moderate speed), then 1x **Capillarization** 8◊

Thu: 1 x **Endurance** 8G

Fri: Rest

Sat: Cycle training 60' (moderate speed), then 1 x **Endurance** 8G

Sun: Cycling 2h30 (moderate speed), then 1 x **Capillarization** 8◊

Programmes: **Endurance** 8G and **Capillarization** 8◊

Preparation for a runner training three times a week who wishes to progress in endurance (half-marathon, marathon)

Munning as many miles as possible is essential in order to improve performance in endurance events. However, the strain on tendons and joints this type of training causes is today universally recognised. Integrating Compex electrostimulation into the training of the long-distance runner offers an excellent alternative that can help to overcome this problem. The **Endurance** programme, which improves the muscles' ability to absorb oxygen, and the **Capillarization** programme (**Vascular** category), which develops the capillaries in the muscles, allow greater endurance to be achieved while limiting the weekly mileage and therefore the risk of injury.

Cycle duration: 8 weeks, 5 x/weekProgression in the levels:

Eg for 1 week

Mon: Rest

Tue: 1 x **Endurance** 8G

Wed:- Voluntary warm up training 20', then 1-2 series of 6 x (30" fast / 30" slow)
- Slow jogging 10' at the end of the session, then 1 x **Capillarization** 8◊

Thu: 1 x **Endurance** 8G

Fri: Rest

Sat: Loose jogging 60', then 1 x **Endurance** 8G

Sun: Extended run 1h30 (moderate speed), then 1 x **Capillarization** 8◊

Programmes: **Endurance** 8G and **Capillarization** 8◊

Pre-season preparation of lactic capacity for a resistance sport with three active training sessions per week (800 metres, track cycling, etc.)

Example of planning to develop the lactic capacity (resistance) of the quadriceps. For other disciplines, the choice of muscles to be stimulated may be different (to determine these muscles in relation to your sporting discipline, refer to the Training planner in the CD-ROM).

During pre-season preparation for sports that make great demands on the lactic anaerobic system (intense effort sustained over as long as possible), it is essential not to neglect specific muscle preparation. Stimulation of the quadriceps (or a different key muscle group depending on the discipline practised) by means of the **Resistance** programme results in improved anaerobic power, as well as greater muscle tolerance to high concentrations of lactates. The practical benefits are evident: improved performance thanks to better muscular resistance to fatigue for exercises of the lactic anaerobic type.

In order to optimise the effects of this preparation, you are advised to supplement it with **Capillarization** sessions, carried out during the week leading up to the competition (see this part: "Programmes and specific applications", "**Vascular** category", "Achieving peak form before competition for resistance sports (eg: 800 metres, 1500 metres, etc.)").

An **Active recovery** session is recommended after the most intensive training. It accelerates the rate of muscle recovery and reduces fatigue during the period of the season when the amount of training is high.

Cycle duration: 6-8 weeks, 4 x/week

Eg for 1 week

Mon: 1 x **Resistance** 8G

Tue: Voluntary training on the track

Wed: 1 x **Resistance** 8G

Thu: Voluntary intensive training on the track, then 1 x **Active recovery** 8◊

Fri: Rest

Sat: Res

Sun: 1 x **Resistance** 8G, followed by session voluntary training on the track

Programmes: **Resistance** 8G and **Active recovery** 8◊

English

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Preparation for a cyclist training three times a week who wishes to improve his power

Developing the strength of the thigh muscles is always beneficial for the competitive cyclist. Certain forms of training on the bicycle (hill work) can make a contribution in this respect. However, results will be more spectacular if additional training using Compex muscular stimulation is undertaken at the same time.

The special regime of muscle contractions of the **Strength** programme and the large amount of work to which the muscles are subjected allow a significant increase of the strength of the thigh muscles.

Moreover, the **Active recovery** programme, carried out within three hours of the most intensive training sessions, encourages muscular recuperation and makes it possible to follow on with qualitative training under optimum conditions.

Cycle duration: 8 weeks, 5 x/week

Eg for 1 week

Mon: Rest

Tue: 1 x **Strength** 8G

Wed: - Cycle training 45' (moderate speed), then 5-10 times on a 500-700 m hill (rapidly)
- Recovery during descent
- Inactivity 15-20', then 1 x **Active recovery** 8◊

Thu: 1 x **Strength** 8G

Fri: Rest

Sat: Cycle training 60' (moderate speed), then 1 x **Strength** 8G

Sun: - Cycling 2h30-3 h (moderate speed)
- Muscle strengthening on hills (use of a high gear ratio remaining seated), then 1 x **Active recovery** 8◊

Programmes: **Strength** 8G and **Active recovery** 8◊

Preparation for a swimmer training three times a week who wishes to improve his swimming power

In swimming, developing the propulsive force of the upper limbs is an important factor in improving performance. Certain forms of voluntary training practised in the water can contribute to this. However, integrating Compex muscular stimulation into the voluntary training programme makes it possible to achieve far better results. The special muscular contraction regime of the **Strength** programme and the large amount of work to which muscles are subjected will allow you to increase significantly the strength of the latissimus dorsi, key muscles for the swimmer.

Moreover, the **Active recovery** programme, carried out within three hours of the most intensive training, encourages muscular recuperation and makes it possible to follow on with qualitative training under optimum conditions.

Cycle duration: 8 weeks, 5 x/week

Eg for 1 week

Mon: Rest

Tue: 1 x **Strength** 18C

Wed: 20-30' swimming training (different styles), then 5-10 times 100 m with pull-boy
- Recovery 100 m backstroke
- Inactivity 15', then 1 x **Active recovery** 18◊

Thu: 1 x **Strength** 18C

Fri: Rest

Sat: 1 h swimming training including some technical work, then 1 x **Strength** 18C

Sun:- 20-30' swimming training (different styles), then 5-10 times 100 m with paddles
- Recovery 100 m backstroke
- Inactivity 15', then 1 x **Active recovery** 18◊

Programmes: **Strength** 18C and **Active recovery** 18◊

Pre-season preparation for a team sport (football, rugby, handball, volleyball, etc.)

Planning example to develop the strength of the quadriceps. Depending on the sport being practised, a different muscle group may be chosen.

During the preparatory pre-season period for team sports, it is essential not to neglect specific muscle preparation. In most team sports, the qualities of speed and strength make all the difference. Stimulation of the quadriceps (or a different key muscle depending on the sport concerned) by means of the Compex **Strength** programme will result in increased speed of contraction and muscular strength. The practical benefits will be obvious: improved speed off the mark and during movement, jumping, shooting power, etc.

An **Active recovery** session, carried out after the most intensive training, accelerates muscular recuperation and reduces fatigue that has built up during the season when the workload is high.

Cycle duration: 6-8 weeks, 6 x/week

Eg for 1 week

Mon: 1 x **Strength** 8G

Tue: Collective training, then 1 x **Active recovery** 8◊

Wed: 1 x **Strength** 8G

Thu: Collective training, then 1 x **Active recovery** 8◊

Fri: 1 x **Strength** 8G

Sat: Rest

Sun: Collective training or friendly match, then 1 x **Active recovery** 8◊

Programmes: **Strength** 8G and **Active recovery** 8◊

Maintaining results achieved during preparation for team sports during the competitive period (football, rugby, handball, volleyball, etc.)

This example concerns only athletes who have completed a full cycle of training by electrostimulation (at least 6 weeks) as part of their pre-season preparation. The weekly session of stimulation with the **Strength** programme should be carried out on the same muscle groups as those stimulated during the preparation period (in our example, the quadriceps).

During the season, when matches are played regularly, care should be taken not to overtrain the specific musculature. On the other hand, nor should the benefits of preparation be lost by suspending stimulation training for too long a period. During this period of competition, muscle qualities should be maintained by means of one weekly session of stimulation carried out using the **Strength** programme. It is also essential to leave a sufficiently long interval between this single weekly stimulation session and the day of the competition (3 days minimum).

The **Active recovery** programme, which must be used during the first three hours after the match, as well as after each session of intensive training, restores muscle equilibrium more quickly.

Cycle duration: During the sport season

Eg for 1 week

Mon: Rest

Tue: Collective training, then 1 x **Active recovery** 8◊ (if training is intensive)

Wed: 1 x **Strength** 8G

Thu: Collective training, then 1 x **Active recovery** 8◊ (if training is intensive)

Fri: Rest

Sat: Rest

Sun: Match, then 1 x **Active recovery** 8◊ (within the 3 hours that follow the competition)

Programme: **Active recovery** 8◊

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Pre-season preparation of the explosive strength of the quadriceps for an athlete training three times a week (long jump or high jump, sprinting, etc.)

For other disciplines the choice of muscles to be stimulated may be different (refer if necessary to the Training planner in the CD-ROM).

For all sports where the essential performance factor is explosive muscle strength, specific muscle preparation is the main factor in pre-season preparation. The explosive strength of muscles may be defined as the capacity of a muscle to attain a high level of maximum strength as quickly as possible. To develop this quality, voluntary training relies on tiring muscle training sessions that often include the risk of injury, since they are necessarily carried out using heavy weights. Integrating the use of the **Explosive strength** programme lightens the muscle training sessions while at the same time offering greater benefits and more time for technical work.

Cycle duration: 6-8 weeks, 4 x/ week

Eg for 1 week

- Mon:1 x **Explosive strength** 8G
- Tue: Voluntary training in stadium
- Wed:1 x **Explosive strength** 8G
- Thu:Voluntary training including technical work jumping pit
- Fri: 1 x **Explosive strength** 8G
- Sat: Rest
- Sun:Voluntary training in stadium followed by 1 x **Explosive strength** 8G

Programme: **Explosive strength** 8G

Muscle volume for a body-builder

Despite repeated efforts during their voluntary training, many body-builders encounter difficulties in developing certain muscle groups. The specific stimulation imposed on muscles by the **Hypertrophy** programme significantly increases the volume of the stimulated muscles. In addition, for a similar session time, the Compex **Hypertrophy** programme provides a greater volume gain than voluntary training.

The additional training imposed by this stimulation programme on muscles not sufficiently receptive to traditional training provides a solution for the harmonious development of all muscle groups without recalcitrant areas.

To obtain optimum progress, you are advised to:

1)precede the **Hypertrophy** sessions with short voluntary training focused on strength; for example 3 series of 5 repetitions at 90% of maximum force;

2)carry out a **Capillarization** session (**Vascular** category) directly after the **Hypertrophy** session.

Muscle volume for a body-builder training three times a week

In this example, we assume that the body-builder wants to work on his/her biceps, which he/she considers to be his/her weak point. It is of course possible to stimulate other muscles as well. Also this stimulation routine can be applied to several muscular groups at the same time (e.g. biceps then calves).

Cycle duration: 8 weeks, 3 x/ week

Progression in the levels

- Week 1: **Hypertrophy** level 1
- Weeks 2-3: **Hypertrophy** level 2
- Weeks 4-5: **Hypertrophy** level 3
- Weeks 6-8: **Hypertrophy** level 4

Eg for 1 week.

- Mon: Rest
- Tue: Voluntary training focused on the muscles of the lower limbs, followed by active work on the biceps: 3 series of 5 repetitions at 90% of Fmax., then 1 x **Hypertrophy** 20D followed by 1 x **Capillarization** 20◊
- Wed: Rest
- Thu: Voluntary training focused on the muscles of the trunk, followed by active work on the biceps: 3 series of 5 repetitions at 90% of Fmax., then 1 x **Hypertrophy** 20D followed by 1 x **Capillarization** 20◊
- Fri: Rest
- Sat: Voluntary training focused on the muscles of the upper limbs, followed by active work on the biceps: 3 series of 5 repetitions at 90% of Fmax., then 1 x **Hypertrophy** 20D followed by 1 x **Capillarization** 20◊
- Sun: Rest

Programmes: **Hypertrophy** 20D and **Capillarization** 20◊

Muscle volume for a body-builder training six times a week

In this example, we assume that the body-builder wants to work on his/her calves that he/she considers to be his/her weak point. It is of course possible to stimulate other muscles as well. Also this stimulation routine can be applied to several muscular groups at the same time (e.g. calves then biceps).

Cycle duration: 12 weeks, 5 x/ week

Progression in the levels

- Week 1: **Hypertrophy** level 1
- Weeks 2-3: **Hypertrophy** level 2
- Weeks 4-5: **Hypertrophy** level 3
- Weeks 6-8: **Hypertrophy** level 4
- Weeks 9-12: **Hypertrophy** level 5

Eg for 1 week.

- Mon: Voluntary training focused on the muscles of the lower limbs, followed by active work on the calf muscles: 3 series of 5 repetitions at 90% of Fmax., then **Hypertrophy** 4A followed by 1 x **Capillarization** 4◊
- Tue: Voluntary training focused on the muscles of the lower limbs, followed by active work on the calf muscles: 3 series of 5 repetitions at 90% of Fmax., then **Hypertrophy** 4A followed by 1 x **Capillarization** 4◊
- Wed: Rest
- Thu:Voluntary training focused on the muscles of the lower limbs, followed by active work on the calf muscles: 3 series of 5 repetitions at 90% of Fmax., then **Hypertrophy** 4A followed by 1 x **Capillarization** 4◊
- Fri: Rest
- Sat: Voluntary training focused on the muscles of the upper limbs, followed by active work on the calf muscles: 3 series of 5 repetitions at 90% of Fmax., then 1 x **Hypertrophy** 4A followed by 1 x **Capillarization** 4◊
- Sun: Rest

Programmes:**Hypertrophy** 4A and **Capillarization** 4◊

Resuming activity after a break in training: variable muscle preparation

In this example, we assume that the sportsman wants to work above all on the latissimus dorsi. It is of course possible to stimulate other muscles as well. Also this stimulation routine can be applied to several muscular groups at the same time (e.g. latissimus dorsi then quadriceps).

The fartlek comes from Scandinavia. It involves diversified training carried on in a natural setting. During training, different work-out routines are alternated and different muscles are stimulated. For example, after a few minutes of slow jogging, the trainee does a series of accelerations followed by some jumps, before resuming a slower jog, and so on. The objective is to work on different muscular qualities without however emphasising any one in particular. This activity is frequently done either at the beginning of the season, for general muscular reactivation, or done regularly by leisure-time sports enthusiasts who do not want to emphasise any particular kind of muscular performance, but rather want to stay fit and reach the right level in all kinds of muscular work.

At the beginning of the season or after a significant break in training, the resumption of physical and/or sports activity should be done progressively and become increasingly specific. It is thus normal to perform a few initial sessions with the aim of making the muscles do all kinds of work to prepare them for later training that will be more intensive and more oriented towards a specific kind of performance.

Through these eight sequences that automatically follow each other, the **Fartlek** programme imposes different kinds of work to the stimulated muscles and thus makes them used to all kinds of effort.

Cycle duration: 1-2 week, 4-6 x/ week

Programme: **Fartlek** 18C

English

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Preparation for a footballer wishing to optimise the effects of active stretching of the hamstrings muscles

The **Stretching** programme consists in stimulating the antagonist (i.e. opposite) muscle of the muscle subjected to stretching in order to exploit a well-known physiological mechanism: reciprocal inhibition reflex. This reflex, based on the proprioceptive sensitivity of muscles, consists of a very marked muscular relaxation. This allows more efficient stretching, since it is carried out on a more relaxed muscle.
Stimulation is therefore performed on the muscle opposing the muscle being stretched. This stimulation consists of a progressive appearance and disappearance (slowly and lasting a long time) of contractions, with complete rest between contractions. It is during the contraction (which increases with each new level) that the athlete stretches the chosen muscle group by means of a traditional voluntary stretching technique.
In this example, the stimulation is carried out on the quadriceps in order to facilitate stretching of the hamstrings muscles during the contraction phases.

Cycle duration: Throughout the season, according to the frequency of voluntary stretching sessions

According to the normal duration of stretching (this depends on schools of physical training and each person's feelings), choose the level that seems most appropriate. The proposed duration of stretching is:
10 seconds for level 1
12 seconds for level 2
14 seconds for level 3
16 seconds for level 4
18 seconds for level 5

Programme: **Stretching** 8, Adopt the starting position for the active stretching exercise

Use of the Regeneration programme to eliminate muscle fatigue more quickly (cross-country running, football, basketball, tennis, etc.) and restore good muscular sensations more quickly

The **Regeneration** programme, known also as the "day-after programme" must be used on key muscles for the discipline being practised. In this example, key muscles for the cross-country runner (quadriceps) will be stimulated. For other disciplines, the choice of muscles to be stimulated may be different (refer if necessary to the Training planner of the CD-ROM). Note that this type of programme is particularly beneficial for all sports where competitions are repeated at frequent intervals, during tournaments and cups in various sports.
The stimulation session using the **Regeneration** programme must be carried out the day after a competition to replace or supplement so-called "restoration" training, which can therefore be less intensive. Contrary to the **Active recovery** programme, which provokes no tetanic contractions and which must be used during the three hours after the competition or intensive training, the **Regeneration** programme is a form of light training which, in addition to an analgesic effect and an increased blood flow, aims to impose a small degree of anaerobic training and likewise to provoke slight tetanic contractions that are not tiring, making it possible to reactivate the proprioceptive pathways. Energy pathways are also gently stimulated, allowing their metabolic equilibrium to re-establish itself.

The session is composed of 6 stimulation sequences that follow on automatically:

1st sequence: analgesic effect
2nd sequence: marked increase in blood flow
3rd sequence: tetanic contractions to restore muscular sensation
4th sequence: activation of the oxydative metabolism
5th sequence: marked increase in blood flow
6th sequence: relaxing effect

Cycle duration: To be used throughout the season, according to the frequency of competitions

Programme: **Regeneration** 8G

Pain relief category

Physical pain is an abnormal and unpleasant sensation caused by an injury, a disorder or incorrect functioning of a part of our organism. It is always a signal sent to us by our bodies, one that should not be ignored, and that in all cases requires us to consult a doctor if it does not disappear quickly.
The approach to pain adopted by the medical profession has changed considerably in recent years. Treatment of the cause is always fundamental, however the pain as such must be otherwise removed or at least considerably reduced and made bearable for the patient. The means to combat pain have developed greatly, and there is no longer any hesitation today in using powerful analgesics to improve the quality of life of patients.
It is within this context that recourse to electrotherapy has developed. Excitation of the nerve fibres of sensation by means of electrical micro-impulses is often the preferred method of combatting pain. Today, such analgesic electrotherapy is widely used, particularly in rehabilitation medicine and in specialist pain treatment centres.
The precision of electrical currents allows the analgesic action to be accurately targeted according to the type of pain. It is up to the user to choose the most appropriate programme for the type of pain and to follow practical recommendations in order to obtain maximum effect.

If the pain is great and/or persistent, you are advised to consult a doctor. Only a doctor can make an accurate diagnosis and put in place therapeutic actions designed to encourage the disappearance of the disorder.

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Table of the pathologies

Pathologies	Programmes	References
Neuralgia of the upper limb (brachial neuralgia)	Modulated TENS	See application page 190
Chronic muscular pain (polymyalgia)	Endorphinic	See application page 190
Contracture (eg: localized contracture in external side of the calf)	Decontracture	See application page 190
Chronic muscular pain in the back of the neck (cervical pain)	Cervical pain	See application page 190
Muscular pain in the thoracic region (thoracic back pain)	Thoracic back pain	See application page 191
Muscular pain in the low back region (low back pain)	Low back pain	See application page 191
Sharp and recent muscular pains affecting a muscle in the low back (lumbago)	Lumbago	See application page 191
Chronic elbow pain (epicondylitis = tennis elbow)	Epicondylitis	See application page 192

Table of the Pain programmes

Programmes	Effects	Uses
Modulated TENS	Blocks transmission of pain by the nervous system	All acute or chronic localized pain
Endorphinic	Analgesic action through the release of endorphins Increased blood flow	To combat chronic muscular pain
Decontracture	Reduced muscular tension Relaxing effect	To combat recent and localized muscular pain
Cervical pain	Analgesic action through the release of endorphins Increased arterial flow	Analgesic current specifically adapted to pains in the back of the neck
Thoracic back pain	Analgesic action through the release of endorphins Increased arterial flow	Analgesic current specifically adapted to low back pain (lumbar region)
Low back pain	Analgesic action through the release of endorphins Increased blood flow	Analgesic current specifically adapted to persistent low back pain (lumbar region)
Lumbago	Reduced muscular tension Relaxing effect	Analgesic current specifically adapted to sharp and sudden low back pain (lumbar region)
Epicondylitis	Blocks transmission of pain by the nervous system	Analgesic current specifically adapted to persistent pain in the elbow

■ *The use of* **Modulated TENS**, **Endorphinic** *and* **Decontracture** *programmes should not be prolonged without medical advice.*

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Specific applications

Neuralgia of the upper limb (brachial neuralgia)

Some people suffer from arthritis in the joints of the vertebrae at the back of the neck, or from arthritis or periarthritis of the shoulder. These situations often give rise to pain that runs down one arm and is known as "brachial neuralgia". These arm pains that start in the shoulder or the back of the neck can be reduced with the Compex **Modulated TENS** programme by following the practical recommendations outlined below.

Cycle duration: 1 week, 1 x/day minimum, then adapt according to how the pain develops

According to requirements, the **Modulated TENS** programme can be repeated a number of times during the same day

Programme: **Modulated TENS** 35◊

Chronic muscular pain (polymyalgia)

Some people suffer from muscular pain that affects several muscles or parts of different muscles at the same time. The localization of this chronic pain can vary over time. These continual and diffuse muscle pains are the result of chronic contractures in which acids and toxins accumulate, irritating the nerves and causing pain. The **Endorphinic** programme is particularly effective against such pain since, in addition to its pain-reducing effect, it increases the blood flow to the contractured muscular groups and removes from them accumulations of acids and toxins.
Example: localized pain in the biceps. However, the pain may affect other muscular groups. The practical application illustrated below remains valid, but it is then necessary to place the electrodes on the muscular group concerned.

Cycle duration: 4 weeks, 2 x/day, with a 10 minute break between the 2 sessions

You are advised to consult your doctor if no improvement is observed after the first week of use

Programme: **Endorphinic** 20◊

Contracture (eg: localized contracture in external side of the calf)

After tiring muscle work, intense training or a sporting competition, certain muscles or certain parts of muscles often remain tense and slightly painful. These are known as muscular contractures which should disappear after a few days with rest, good rehydration, a balanced food intake with mineral salts and application of the **Decontracture** programme. . The phenomenon of contracture frequently affects the calf muscles, but can also occur with other muscles. In this case, simply follow the same practical recommendations as below, but place the electrodes on the muscular group concerned.

Cycle duration: 1 week, 1 x/day

You are advised to consult your doctor if no improvement is observed after the first week of use

Programme: **Decontracture** 24◊

Chronic muscular pain in the back of the neck (cervical pain)

Positions in which the muscles of the back of the neck remain tense for long periods of time, for example working in front of a computer screen, may be responsible for the onset of pain in the back of the neck or on either side of the base of the neck, in the upper back. These pains are due to a contracture of the muscles, of which the prolonged tension crushes the blood vessels and prevents the blood from supplying and oxygenating the muscle fibres. If this phenomenon is prolonged, there is an accumulation of acid and the blood vessels atrophy. The pain then becomes continuous or appears after only a few minutes spent working in an unfavourable position.
These chronic pains in the back of the neck can be treated effectively with the **Cervical pain** programme, which reactivates the circulation, drains accumulations of acid, oxygenates the muscles, develops the capillaries and relaxes the contractured muscles.

Cycle duration: 4 weeks, 2 x/day, with a 10 minute break between the 2 sessions

You are advised to consult your doctor if no improvement is observed after the first week of use

Programme: **Cervical pain** 15◊

Muscular pain in the thoracic region (thoracic back pain)

Vertebral arthritis and positions in which the muscles of the spinal column remain under tension for long periods of time are often responsible for the onset of pain in the middle of the back, which is accentuated with fatigue. Pressure of the fingers on the muscles on either side of the spinal column can often trigger a sharp pain.
These pains are due to a contracture of the muscles, of which the prolonged tension crushes the blood vessels and prevents the blood from supplying and oxygenating the muscle fibres. If the phenomenon is prolonged, there is an accumulation of acid and the blood vessels atrophy. The pain then becomes continuous or can appear after only a few minutes spent working in an unfavourable position.
These chronic back pains can be effectively treated with the **Thoracic back pain** programme which reactivates the circulation, drains accumulations of acid, oxygenates the muscles, develops the capillaries and relaxes the contractured muscles.

Cycle duration: 4 weeks, 2 x/week with a 10 minute break between the 2 sessions

You are advised to consult your doctor if no improvement is observed after the first week of use

Programme: **Thoracic back pain** 13◊

Muscular pain in the low back region (low back pain)

Low-back pain is the most frequently encountered pain. In a standing position, the entire weight of the trunk is concentrated on the joints between the last vertebrae and the sacrum. The low back region is therefore under particular strain. The discs between the vertebrae are crushed and the low back muscles contractured and painful.

There are very many treatments for the relief of low back pain sufferers; among these, the specific currents of the Compex **Low back pain** programme provide an appreciable improvement and can even resolve the problem if it is essentially muscular in origin.

Cycle duration: 4 week, 2 x/day, with a 10 minute break between the 2 sessions

You are advised to consult your doctor if no improvement is observed after the first week of use

Programme: **Low back pain** 12◊

Sharp and recent muscular pains affecting a muscle in the low back (lumbago)

During back movement, for example when lifting something, when turning or when standing up straight after bending down, a sudden pain can be triggered in the low back. Those who suffer from this problem present a contracture of the low back muscles and feel a sharp pain in this region; because they cannot stand completely straight, they remain bent over on one side. All of these symptoms indicate what is known as lumbago, which is principally the result of a sharp and intense contracture of the low back muscles (lumbar region).
In a situation such as this, it is always necessary to consult a doctor to receive appropriate treatment
In addition to such treatment, the specific Compex **Lumbago** programme can help effectively to relax the muscles and remove the pain.

Cycle duration: 4 weeks, 3 x/week

You are advised to consult your doctor if no improvement is observed after the first week of use

Programme: **Lumbago** 33◊

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Chronic elbow pain (epicondylitis = tennis elbow)

All tendons of the muscles that allow us to stretch our hand, wrist and fingers end at the small external bone mass of the elbow (epicondyle). Hand and finger movements therefore transmit tensions that are concentrated in the tendon endings at this bone mass.

When hand movements are repetitive, as is the case for painters, tennis players or even those who constantly use the mouse of a computer system, small injuries, accompanied by inflammation and pain, develop in the region of the epicondyle. This is known as "epicondylitis", which is characterised by pain around the external bone mass of the elbow when pressure is applied or when the forearm muscles are contracted.

The Compex **Epicondylitis** programme supplies specific current to combat this type of pain. It acts effectively as a supplement to rest.

However, it is neccary to consult your doctor if the pain gets worse or does not disappear quickly after a few sessions.

Cycle duration: 1 week, 2 x/week minimum, then adapt according to how the pain develops

According to requirements, the Epicondyiltis programme can be repeated a number of times during the same day.

Programme: **Epicondylitis** 36◊

Vascular category

The low frequency current used of the Vascular category of Compex programmes significantly improves blood circulation in the stimulated area.

Indeed many people, more particularly women who remain standing for long periods, suffer from circulatory problems. These mainly affect the legs and are caused by stagnation of the blood and the lymph and are manifested by a feeling of "heavy legs", swelling, or the dilatation of surface veins. The consequences are multiple: fatigue, tension, pain, lack of oxygenation of tissue and the appearance of varicose veins and oedemas.

According to the programme used, the muscular twitches are more or less rapid, separate, and adopt different rhythms. The result is a specific action for each programme, and for this reason you are advised to follow closely the indications of the different treatments so that optimum results can be obtained.

If the symptoms are serious and/or persistent, you are advised to consult a doctor. Only a doctor can establish an accurate diagnosis and put in place all therapeutic measures required to cure the disorder.

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Programmes	Effects	Uses
Capillarization	Very marked increase in blood flow Development of capillaries	In the period before competition, for those participating in endurance or resistance sports As a supplement to a programme of the Aesthetic category To improve endurance in those whose fitness level is not high
Heavy legs	Increased venous return Increased supply of oxygen to muscles Drop in muscular tension Elimination of tendency to have cramp	To remove the feeling of heaviness in the legs arising in unusual situations (standing for long periods, heat, hormonal imbalance linked to the menstrual cycle, etc.)
Cramp prevention	Improved circulation to prevent the onset of nocturnal cramp or cramp after strains	Cramp mainly affects muscles of the lower limbs, in particular the calf muscles
Lymphatic drainage	Deep massage of the stimulated area Activation of return lymphatic circulation	To contrast occasional swelling of the feet and ankles As a supplement to pressure therapy or manual lymphatic drainage *Do not use without medical advice in case of oedemas that are the side effect of a pathological problem*

Specific applications

Preparation for seasonal endurance activity (eg: hiking, bicycle touring)

Sporting physical activities that last a long time (walking, cycling, cross-country skiing, etc.) require strong muscles with a good capillary circulation so that the muscle fibres can be properly oxygenated. When a long-duration physical activity is not practised, or not practised regularly enough, the muscles lose their capacity to effectively consume oxygen and the capillary system becomes rarefied. This lack of muscular quality makes exercising uncomfortable and limits the speed of recuperation, and is responsible for many unpleasant side effects such as drowsiness, contractures, cramp and swelling.
To restore to muscles their endurance and ensure full activation of the capillary system, the Compex offers a very efficient mode of stimulation.

Cycle duration: 6-8 weeks, before starting the hike, 3 x/week, alternating muscular groups

Programmes: **Capillarization** 8◊ and 25◊

Achieving peak form before competition for resistance sports (eg: 800 metres, 1500 metres, mountain biking, mountain stage in cycling, cycling pursuit on track, 200 metres swimming, slalom)

Sports that require maximum effort lasting between 30 seconds and 5 minutes are the so-called resistance sports. Rapid fibres must work at a capacity close to their maximum and be capable of maintaining this intensive work throughout the event without weakening, in other words the rapid fibres must be resistant.
The **Capillarization** programme, which produces a very significant increase in the blood flow in the muscles, brings about development of the intramuscular capillary system (capillarization). This growth of the capillaries works best if it occurs around the rapid fibres. In this way, the latter's exchange surface with the blood increases, allowing an improved supply of glucose, better diffusion of oxygen and quicker evacuation of lactic acid. Capillarization therefore allows the rapid fibres to be more resistant and to maintain their optimum capacity over a longer period.
However, prolonged or too frequent use of this programme may induce a modification of rapid fibres into slow fibres, thereby risking a decline in performance for strength and speed sports. It is therefore important to follow closely the recommendations below concerning the specific application in order to benefit from the positive effects of this treatment.

Cycle duration: 1 week before competition, 2 x/day, with a 10 minute break between the 2 sessions

Programme: **Capillarization** 8◊

Prevention of contractures in the muscles of the back of the neck for cyclists

During voluntary training or competitions, some athletes experience the problem of contractures in support muscles (for example, the back of the neck for cyclists). Use of the **Capillarization** programme reduces, and may resolve, this problem. The marked increase in blood circulation and development of the capillary system improve the oxygenation of fibres and their exchanges with the blood. The muscle therefore becomes less prone to contractures.

Cycle duration: 3 weeks, 1 x/day

Programme: **Capillarization** 15◊

Prevention of the feeling of heaviness in the legs

The feeling of heaviness in the legs is due to a temporary deficiency in the venous return, and not to major organic lesions. Stagnation of the blood mass in the legs is encouraged in certain situations: prolonged periods in a standing position, long periods continuously seated, intense heat, etc. The insufficient supply of oxygen to the tissue, and in particular the muscles, that results from this situation, causes the feeling of heaviness and discomfort in the legs. Use of the **Heavy legs** programme accelerates the return of blood to the veins and has an important relaxing effect on the painful muscles.

Cycle duration: Use this treatment whenever an occasional feeling of heaviness in the legs occurs

Programme: **Heavy legs** 25 JL

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Prevention of cramp in the calf muscles

Many people suffer from cramp in the calf muscles, which can appear spontaneously during rest at night or as a result of prolonged muscular effort. The phenomenon of cramp may in part be caused by a disequilibrium of blood flow in the muscles.
To improve the blood circulation and prevent the onset of cramp, the Compex offers a specific stimulation programme. Use of this programme in accordance with the procedure below will allow you to obtain positive results and limit the occurrence of cramp.

Cycle duration: 5 weeks, 1 x/day, at the end of the day or at night

Programme: **Cramp prevention** 25◊

Prevention of occasional swelling of the feet and ankles

Insufficient blood circulation in the veins in unusual circumstances frequently gives rise to an accumulation of blood and lymph in the extremities of the lower limbs.
This phenomenon, which results in swelling of the ankles and feet, brings with it an unpleasant sense of heaviness and tension in the areas concerned. The deep massage caused by the **Lymphatic drainage** programme will effectively activate lymph return circulation and thus encourage the elimination of this disorder.

Cycle duration: 8 weeks, 3 x/week

Use this treatment whenever you experience occasional swelling of the feet and ankles

Programme: **Lymphatic drainage** 25◊

Massage category

The programmes of the Compex Massage category subject the muscles of the stimulated region to moderate activity, which produces beneficial effects that help to improve physical comfort and well-being.
Remaining in the same working position for a long time (for example, sitting in front of a computer screen), conditions of stress, repeated jostling, insufficient muscular conditioning before physical activity are all very frequent situations that are often responsible for uncomfortable bodily sensations.
The automatic progression of the various stimulation sequences, specific to each programme of the Massage category, allows each user to adapt the effects of stimulation to his own needs and objectives.

If strong pain persists, the programmes of the Massage category should never be used for long periods without first seeking medical advice.

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Programmes	Effects	Uses
Relaxing massage	Decreased muscular tension Drainage of the toxins responsible for the exaggerated increase of muscular tone Effect of well-being and relaxation	To eliminate uncomfortable or painful sensations, following an exaggerated increase of muscular tone
Reviving massage	Considerable increase of blood flow in the stimulated region Improvement of tissue oxygenation Elimination of free radicals	To contrast effectively sensations of fatigue and localised heaviness
Toning massage	Activation of blood circulation Recovery of muscular contractile properties Invigorating effect	To prepare the muscles in an ideal manner before an unusual/one-time physical activity

Specific applications

Treatment of uncomfortable muscular tensions in the back of the neck

Remaining in a seated position for long periods, associated with repetitive movements of the upper limbs (as is frequently the case in front of a computer screen), is often responsible for an uncomfortable – or even painful – increase of muscle tension of the back of the neck muscles.
Any other condition of stress may also create situations leading to a state of excessive muscular tension, which is often responsible for painful or uncomfortable sensations.
The in-depth effects produced by the **Relaxing massage** programme enable to contrast effectively such painful sensations, with a particularly significant result in terms of relaxation.

Cycle duration:To be used on the back of the neck muscles, whenever an occasional sensation of painful muscular tension is felt; to be repeated, if necessary, in cases of particularly strong muscular tension

Programme: **Relaxing massage** 15◊

Treatment of a localised sensation of heaviness or an occasional state of fatigue

The many stresses of everyday life are often responsible for uncomfortable, or even painful, physical sensations. A circulation slowdown is often the result of insufficient physical activity, frequently aggravated by the need in one's working life to remain in the same position for many hours (in a seated position, for example).
Although not serious, this simple "vascular slowdown" is, however, frequently the cause of unpleasant sensations (for example: a sensation of heaviness, often localised in the lower limbs, but also, at times, in another region of the body).
The **Reviving massage** programme produces, in the greatest comfort, a reactivation of the blood circulation that allows an acceleration of tissue oxygenation and the elimination of painful sensations, due to insufficient physical effort.

Cycle duration: To be used on the calf muscles, whenever an occasional sensation of heaviness is felt; to be repeated, if necessary, in cases of persistent discomfort

Programme: **Reviving massage** 25◊

Muscular and circulation conditioning before physical activity

People who regularly practise sports are well aware of the transition, which is often painful, between a rest activity and an occasional physical effort.
The objective of the usual warming-up techniques is to respond to this need to activate progressively the physiological functions involved in one-time physical activity. This physiological need is also very desirable for moderate but unusual physical efforts, as is frequently the case for most of us (treks, biking, jogging, etc.).
The **Toning massage** programme offers an ideal benefit in the form of optimal muscular and circulation conditioning before any type of physical effort. It allows us to avoid the uncomfortable sensations – usually experienced during the first few minutes of unusual physical efforts – and to limit the secondary consequences of insufficient preparation (aches, etc.).

Cycle duration: To be used on the muscles most subject to stress in the physical activity involved (in this example: the quadriceps), in the last thirty minutes preceding physical activity.

Programme: **Toning massage** 8◊

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Rehabilitation category

The muscular consequences of any pathological problem must be treated by means of specific programmes. Indeed, improving the qualities of a healthy muscle or restoring the potential of a "convalescent" muscle require appropriate work regimes. In order to "redevelop" a convalescent muscle, it is necessary to use the programmes of the Rehabilitation category.

Muscle volume is quickly reduced after trauma to a bone or a joint, particularly if the injury is treated by immobilisation and/or surgical intervention. This muscular atrophy can be much more progressive in the case of a degenerative injury (such as arthrosis, for example), since the reduction of muscle activity then often increases slowly and is superimposed on the developing pathology. The phenomenon of atrophy is accompanied by a reduction of muscle strength; however, these disturbances are the consequence of various alterations at the level of the muscle fibres.

In a rehabilitation process, it is essential, initially, to treat the atrophy (i.e. regain normal muscle volume) before attempting to increase the strength of the muscle using the Reinforcement programme.

The use of programmes of the Rehabilitation category must under no circumstances replace rehabilitation sessions carried out in the presence of the physiotherapist. Although the restoration of initial muscular qualities is a key factor in the process of rehabilitation, other aspects (joint mobility, vigilance, residual pain, etc.) can only be dealt with effectively by a competent health professional.

Some pathologies and some post-operative rehabilitations require special precautions during use; *you are therefore always advised to seek the opinion of your doctor or physiotherapist before using any of the programmes of the Rehabilitation category.*

Osteosynthesis equipment: The presence of osteosynthesis equipment (metallic equipment in contact with the bone: pins, screws, plates, prostheses, etc.) is not a contra-indication for the use of Compex programmes. The electrical current of the Compex are specially designed to have no harmful effect with regard to osteosynthesis equipment.

Programmes	Effects	Uses
Disuse atrophy	Reactivation of the trophic action of muscle fibres damaged during atrophy	Treatment to combat any reduction of muscle volume: - as a result of trauma necessitating immobilisation - accompanying degenerative lesions to joints
Muscle growth	Increased diameter and capacity of muscle fibres damaged during under-activity or inactivity imposed by some kind of pathological problem Restoration of muscle volume	After a period of using the **Disuse atrophy** treatment, as soon as the muscle shows signs of a slight recovery of volume or tone Until the virtually complete restoration of muscle volume
Reinforcement	Increase the strength of a muscle previously atrophied Increase the strength of a muscle affected by a pathological process	At the end of rehabilitation, when the muscle has regained normal muscle volume From the onset of rehabilitation for non-atrophied muscles

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Specific applications

Atrophy of the quadriceps as a result of trauma

The quadriceps is a voluminous muscle located in the anterior part of the thigh. It is the main muscle that allows you to stretch the knee; its role is therefore essential for walking, running, climbing stairs, etc. Any trauma affecting a lower limb therefore results in a wasting of this muscle, the reduction of muscle volume being more or less serious depending on the duration of the period of inactivity.
This atrophy is normally spectacular when it occurs after trauma to the knee, particularly if the trauma was treated by means of surgical intervention.
The programmes of the **Rehabilitation** category are specifically designed to treat the deterioration of muscle fibres that results from such a process. The progressiveness of the work imposed by the different recommended programmes is decisive in obtaining optimum results.

Cycle duration: 10 weeks

Weeks 1-2: 1 x/ day **Disuse atrophy** 8G
Weeks 3-8: 1 x/ day **Muscle growth** 8G
Weeks 9-10: 1 x/ day **Reinforcement** 8G

Programmes: **Disuse atrophy, Muscle growth** and **Reinforcement** 8G

Atrophy of the gluteus as a result of arthrosis of the hip (coxarthrosis)

The pain and stiffening that result from osteoarthrosis of the hip normally lead to under-utilisation of the buttock muscles, causing a reduction of the volume and quality of these muscles.
The main effect of this atrophy is to produce instability of the pelvis, which causes limping and accentuates the pain by increasing the pressures supported by the joint. Lesions affecting the cartilage unfortunately remain irreversible. However, a remedy for atrophy of the gluteus makes it possible to improve the stability of the joint and therefore make the hip less painful by allowing it to maintain a satisfactory mechanical function.

Cycle duration: 10 weeks, then maintenance

Weeks 1-2: 1 x/ day **Disuse atrophy** 9ABL
Weeks 3-8: 1 x/ day **Muscle growth** 9ABL
Weeks 3-8: 1 x/ day **Reinforcement** 9ABL
Week 11 and following weeks: 1 x/ day **Reinforcement** 9ABL

Programmes: **Disuse atrophy, Muscle growth** and **Reinforcement** 9ABL

Development of the latissimus dorsi to treat and prevent tendinous shoulder pain (rotator cuff syndromes)

The shoulder is a complex joint enabling us to make broad gestures (for example, raising our arms in the air). During some of these movements, the tendons in the shoulder can rub against or be compressed against bony fragments of the joint. When this phenomenon is repeated, or occurs in certain patients who have an unfavourable anatomic constitution, such damage to the tendons causes them to become inflamed and thicker, resulting in a considerable increase in their degree of compression. The pain often then becomes very severe, preventing all movement of the shoulder; it can even set in at night and cause serious sleep deprivation.
Appropriate medical treatment can only be put in place by consulting a doctor. However, electrostimulation of the latissimus dorsi by means of specific Compex programmes can reduce the distress to which tendons are subjected by increasing their freedom of movement around the shoulder joint.

Cycle duration: 6 weeks, then maintenance

Weeks 1-2: 1 x/ day **Disuse atrophy** 18C
Weeks 3-6: 1 x/ day **Muscle growth** 18C
Week 6 and following weeks: 1 x/ day **Reinforcement** 18C

Programmes: **Disuse atrophy Muscle growth** and **Reinforcement** 18C

Development of the abdominal belt to prevent pain in the lumbar region (low back pain)

Low back pain arises most frequently among subjects who do not have sufficient musculature in the abdominal region.
These muscles in fact represent a veritable natural "corset", the role of which is to protect the low back region from excessive stress of all kinds. This is why it is referred to as the abdominal "belt". After a bout of lumbago, when the pain has stopped (see Section "Pain category" in Part IV of this manual), a common recommendation is to improve the efficiency of the abdominal and back muscles to prevent any recurrence. The **Disuse atrophy** programme imposes a large amount of work on the abdominal muscles, without requiring the harmful or even dangerous positions often adopted when voluntary exercises are carried out incorrectly. An abdominal belt that has greater strength and endurance can then satisfactorily fulfil its role of protecting the low back region.

Cycle duration: 4 weeks, then maintenance

Weeks 1-4: 1 x/ day **Disuse atrophy** 10I
Weeks 5 and following weeks: 1 x/ day **Disuse atrophy** 10I

Programme: **Disuse atrophy** 10I

Development of the low back muscles to prevent pain in the lumbar region (low back pain)

Like the muscles of the abdominal region, the muscles of the low back (lumbar muscles) also play a role in protecting the low back region. Subjects whose low back muscles are inadequately effective are particularly prone to low back pain. Once the pain in the low back has disappeared, patients are often advised to strengthen the low back muscles with a view to preventing the recurrence of painful episodes. However, carrying out voluntary back exercises often presents serious difficulties for patients who suffer from low back pain. That is why electrostimulation of the low back muscles using the **Disuse atrophy** programme is one of the preferred methods to improve the efficiency of these muscles.

Cycle duration: 4 weeks, then maintenance

Weeks 1-4: 1 x/ day **Disuse atrophy** 14L
Weeks 5 and following weeks: 1 x/ day **Disuse atrophy** 14L

Programme: **Disuse atrophy** 14L

Strengthening of the lateral peroneus muscles after ankle sprain

The purpose of the lateral peroneus muscles is to maintain the stability of the ankle joint and prevent it from rotating inwardly. After a sprain, these muscles lose their reflex-contraction capacity together with much of their strength. Regaining competent lateral peroneal muscles after a sprain is a fundamental step, without which recurrence is very probable. To do their job correctly, the lateral peroneals must be strong enough to prevent the foot twisting inwards, but they must also contract reflexively at the precise moment when the heel tilts inwards. To develop both of these aspects, strength and speed of contraction, you should use the **Reinforcement** programme, which produces efficient lateral peroneal muscles and therefore helps to prevent recurrence.

Cycle duration: 4 weeks, then maintenance

Weeks 1-4: 1 x/ day **Reinforcement** 2A
Weeks 5 and following weeks: 1 x/ day **Reinforcement** 2A, if you take part in a dangerous sporting activity

Programme: **Reinforcement** 2A

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Fitness category

Today there are more fitness enthusiasts than ever before, and their number is rising. Apart from some rare individuals who have real competitive targets, the vast majority have only one aim: to restore their body to peak physical condition or maintain it at that level.
Cardio training therefore alternates with more specific exercises to develop or maintain a good quality musculature.
With this in mind, the sought-after aims may differ according to who is doing the training: increasing muscle volume to achieve an imposing stature (body-building) or better muscle endurance to improve physical comfort during sustained efforts.
Combined with a voluntary physical activity (aerobic exercises in the fitness facility, footing, cycling, swimming, etc.), which becomes more pleasant and therefore more effective, the programmes of the Fitness category enable users to obtain a toned and harmonious figure.

The treatments of the Fitness category are intended to make healthy muscles work, they are not suitable for atrophied muscles that have suffered from any kind of pathological process. For such muscles, it is necessary to use the programmes of the Rehabilitation category (see this section further on this chapter).

Programmes	Effects	Uses
Muscle starter	Improvement of the contractile qualities of insufficiently used muscles Restoration and/or improvement of cellular exchanges at the level of the stimulated muscles	To reactivate the muscles of sedentary subjects and restore physiological muscular qualities To complement efficiently a voluntary physical activity practiced to be in good condition
Muscle building	Hypertrophy Increased diameter of muscle fibres	For those who wish to gain muscle volume and mass
Aerobic	Increased muscle ability to sustain long-lasting efforts Improved consumption of oxygen of the stimulated muscles	To improve physical comfort during aerobic activities To delay the onset of muscle fatigue during long-duration activities To improve well-being during daily life activities

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Specific applications

Preparing the thighs prior to a week skiing for a sedentary person

Seasonal physical activity, such as skiing, even if practised as a leisure activity, will subject the organism of sedentary subjects to unusual stresses. The thigh muscles (quadriceps) are the muscles that are most used, and these play an essential role in protecting the knee joints. It is for this reason that the pleasure of the first few days' skiing is frequently spoilt by severe muscle sores, and even knee trauma, which can sometimes be serious. The Compex **Muscle starter** and **Muscle building** programmes offer ideal muscular preparation for the thigh muscles. You can then go skiing without fear of overdoing things, with enhanced pleasure and safety.

Cycle duration: 6-8 weeks

Week 1-3: 2 x **Muscle starter** 8G / week
Week 3-6: 3 x **Muscle building** 8G / week

Progression in the levels

Weeks 1-3: **Muscle starter** step to the next level every session

Weeks 1-3: **Muscle building** step to the next level every week

Programmes: **Muscle starter** and **Muscle building** 8G

Shaping and developing the shoulders for an active person

Most voluntary physical activities, such as jogging or cycling, do not make intensive use of the shoulder muscles. That is why it is particularly beneficial to offset this under-utilisation by combining Compex sessions with your voluntary training programme. The **Muscle building** programme imposes a very large quantity of work specifically on muscles of the upper body, bringing about an increase in volume and harmonious development of the shoulders. As opposed to voluntary exercises carried out with heavy weights, that are liable to damage joints and tendons, stimulation with the Compex causes few, if any, strains to joints and tendons

Cycle duration: 4 weeks minimum

Eg for 1 week

Mon: 45'-1h of of voluntary physical activity (jogging, swimming, cycling, fitness activity, etc.), then 1 x **Muscle building** 17H

Tue: Rest

Wed: 1 x **Muscle building** 18C

Thu: 45'-1h of voluntary physical activity (jogging, swimming, cycling, fitness activity, etc.)

Fri: 1 x **Muscle building** 17H

Sat: Rest

Sun: 1 x **Muscle building** 18C

Programmes: **Muscle building** 18C and 17H

Improve physical comfort and pleasure during long-lasting activity (eg: jogging, biking, leisure swimming)

Many people, even on a non-competitive basis, regularly practice an aerobic type physical activity involving moderate intensity but long-lasting effort. This method is today unanimously considered to be the healthiest approach: it enables the person to improve and maintain cardio-vascular and muscle qualities. Using the **Aerobic** programme (possibly combined with the **Capillarization** programme of **Vasclular** category), these enthusiasts can develop the ability of their muscles to use efficiently the oxygen provided by the organism. More pleasure, a better physical comfort during leisure activities and the supplementary benefit of achieving objectives are thus obtained.

Cycle duration: 8 weeks 4 x/week,

Eg for 1 week

Mon: Rest

Tue: 1 x **Aerobic** 8G

Wed: 45'-1 h of voluntary activity of aerobic type (footing, cycling, swimming, etc.), then according to your possibilities and optionally, 1 x **Capillarization** 8◊

Thu: 1 x **Aerobic** 8G

Fri: Rest

Sat: 45'-1 h of voluntary activity of aerobic type (footing, cycling, swimming, etc.)

Sun: If possible, 1 h-1h15 of voluntary activity of aerobic type (footing, cycling, swimming, etc.), then, according to your possibilities and optionally, 1 x **Capillarization** 8◊

Programmes: **Aerobic** 8G and **Capillarization** 8◊

VII. TABLE WITH PLACEMENTS OF ELECTRODES AND STIMULATION POSITIONS

The following table will help you to determine which electrode placement and associated stimulation position to adopt, depending on the chosen programme.

It should be read together with the poster:

- the numbers on the table refer to the electrode placement pictures in the poster;
- the letters refer to the pictograms of the corresponding body positions.

The table also indicates the stimulation energy to use, according to the programme.

Example:

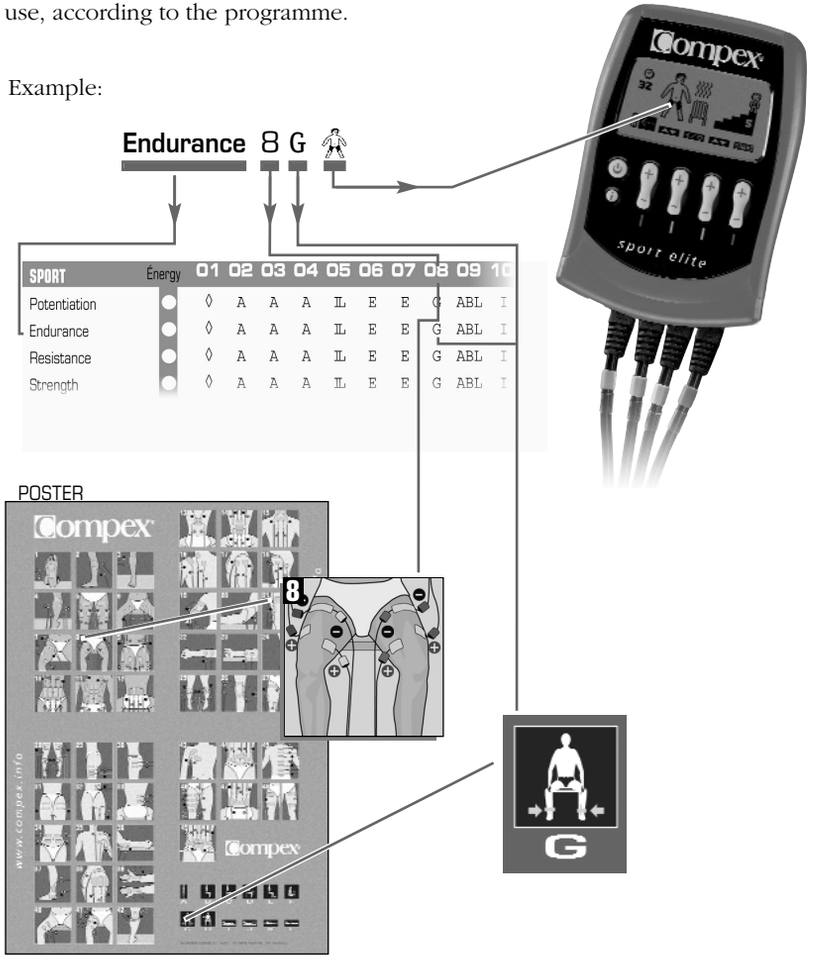

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Table with placements of electrodes and stimulation positions

SPORT	Energy	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Potentiation	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Endurance	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Resistance	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Strength	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Explosive strength	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Hypertrophy	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Fartlek	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Stretching		*Increase progressively the intensities to obtain a tension that is clearly perceived (eg.: 3, 4, 5, 7, 8); Comfortable position*																								
Active recovery	✱	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	-	◊
Regeneration	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-

PAIN RELIEF	Energy	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Modulated TENS	✺	*Cover the painful area (eg.: 26, 35, 36, 37, 38, 39); Comfortable position*																								
Endorphinic	✱	*Positive electrode on the painful point (eg.: 12, 13, 15); Comfortable position*																								
Decontracture	✱	*Positive electrode on the painful point (eg.: 24) or standard placement (01-23); Comfortable position*																								
Cervical pain	✱	-	-	-	-	-	-	-	-	-	-	-	-	-	-	◊	-	-	-	-	-	-	-	-	-	-
Thoracic back pain	✱	-	-	-	-	-	-	-	-	-	-	-	-	◊	-	-	-	-	-	-	-	-	-	-	-	-
Low back pain	✱	-	-	-	-	-	-	-	-	-	-	-	◊	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbago	✱	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epicondylitis	✱	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SPORT	Energy	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Potentiation	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Endurance	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Resistance	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Strength	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Explosive strength	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Hypertrophy	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Fartlek	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Stretching		*Increase progressively the intensities to obtain a tension that is clearly perceived (eg.: 3, 4, 5, 7, 8); Comfortable position*																							
Active recovery	✱	-	◊	◊	-	-	◊	-	-	◊	-	-	-	-	-	-	-	-	◊	◊	-	-	-	-	-
Regeneration	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-

PAIN RELIEF	Energy	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Modulated TENS	✺	*Cover the painful area (eg.: 26, 35, 36, 37, 38, 39); Comfortable position*																							
Endorphinic	✱	*Positive electrode on the painful point (eg.: 12, 13, 15); Comfortable position*																							
Decontracture	✱	*Positive electrode on the painful point (eg.: 24) or standard placement (01-23); Comfortable position*																							
Cervical pain	✱	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thoracic back pain	✱	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low back pain	✱	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbago	✱	-	-	-	-	-	-	-	◊	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epicondylitis	✱	-	-	-	-	-	-	-	-	-	-	◊	-	-	-	-	-	-	-	-	-	-	-	-	-

● = *Maximum tolerable energy*
✱ = *Pronounced twitches*
✺ = *Tickling sensation*

◊ = *Comfortable position*
- = *Non applicable*

Letters in the table refer to pictograms for the body positions in the poster

Table with placements of electrodes and stimulation positions

VASCULAR	Energy	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Capillarization	*	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	-	◊
Heavy legs	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	JL
Cramp prevention	*	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	-	◊
Lymphatic drainage	*	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	-	◊

MASSAGE	Energy	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Relaxing massage	*	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	-	-
Reviving massage	*	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	-	-
Toning massage	*	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊	-	-

REHABILITATION	Energy	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Disuse atrophy	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Muscle growth	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Reinforcement	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-

FITNESS	Energy	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Muscle starter	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Muscle building	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-
Aerobic	●	◊	A	A	A	IL	E	E	G	ABL	I	I	B	B	B	B	B	H	C	D	D	D	F	F	-	-

VASCULAR	Energy	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Capillarization	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	◊	◊	-	-	-	-	-
Heavy legs	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cramp prevention	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	◊	◊	-	-	-	-	-
Lymphatic drainage	*	-	-	-	-	-	◊	-	-	◊	-	-	-	-	-	-	-	-	◊	◊	-	-	-	-	-

MASSAGE	Energy	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Relaxing massage	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	◊	◊	-	-	-	-	-
Reviving massage	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	◊	◊	-	-	-	-	-
Toning massage	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	◊	◊	-	-	-	-	-

REHABILITATION	Energy	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Disuse atrophy	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Muscle growth	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Reinforcement	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-

FITNESS	Energy	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Muscle starter	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Muscle building	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-
Aerobic	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	I	-	-	-	-	-

● = *Maximum tolerable energy*
* = *Pronounced twitches*
✺ = *Tickling sensation*

◊ = *Comfortable position*
- = *Non applicable*

Letters in the table refer to pictograms for the body positions in the poster

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